

Remarks

This Amendment and Response is being submitted in response to the non-final Office Action mailed Feb. 2, 2009. Claims 27-40 are pending in the Application.

Claims 37 – 40 are rejected under 35 USC 112, first paragraph. The examiner states “In claim 37, the step of reclaiming occurs as a final step.” The examiner notes that reclaiming the lump feed material is not the last step in the process. Claim 37 has been amended by moving the last step and placing it after the “storing”step. Support for this amendment can be found in the paragraph bridging pages 8 and 9 of the specification.

Claims 27-32 have been rejected under 35 U.S.C. 103(a) as unpatentable over Meyer et al in view of Fujita et al, and Ando et al. Of the 3 steps in claim 27, namely providing a lump ore material, drying the lump ore material, and charging the dried material into a gas-based direct reduction process, Myer et al teach none of these steps. Myer et al clearly teach pellets as read in cols. 3 and 4. The examiner concludes that “lump read on pellets”. Contrarily, the present invention states on page 5, the first and second full paragraphs, that lump ore is not the same as pellets. Further the present invention states there is a significant financial penalty for using pellets. Next, Myer et al do not teach a drying step for lump (or pellets) at a temperature of about 200 °C to reduce the water content to about 0.5 wt. %. Last Myer et al mention that further process of the invention is to fire the pellets in a direct reduction stage (col. 3, lines 17 – 19) but is does not state any conditions, such as those set forth in claim 27.

Fujita et al also teach the use of pellets. As the present invention states, pellets are produced from iron ore (page 5, the first and second full paragraphs) and as corroborated by col. 1, lines 22 – 41 of Fujita et al. It is these man made products of Fujita et al that have micro-pores (col.1 lines 39 – 41 of Fujita et al), not nature made lump ore as with the present invention. Thus Fujita et al do not teach the first step of claim 27. Fujita et al

do not teach a drying step, and specifically not a drying step under the conditions of the second step of claim 27. Lastly, Fujita et al teach placing the pellets in a blast furnace. A blast furnace has coke and other materials. It is not a direct reduction furnace. There is no similarity between the 2 devices (see the differences described in col. 1 lines 14 – 21 of Ando et al). Although the examiner relies on Fujita et al for a micro-pores structure, it is a man made product, not a natural product like the present invention. There is not a drying step and there is no charging of material into a direct reduction furnace. Fujita et al do not supply any deficiencies of Myer et al and vice versa.

Ando et al teach an improved direct reduction device. Thus it does not teach the first and second steps of claim 27. Further, near the bottom of col. 1 of Ando et al, it discusses a “charge 2”. Figure 1 shows the charge as pellets, and col. 5, lines 5-7 states that a difficulty can be alleviated by combining the ore with a carbonaceous substance into composite pellets (again a man made product). Clearly the first step of claim 27 of providing a lump material is not taught, and a drying step for the lump material is not taught by Ando et al. While Ando et al do mention drying pellets, no temperature is stated and because the products that are dried are very different, i.e. pellets vs. lump ore, it is not obvious to use any drying system. In fact, the paragraph bridging pages 5 and 6 of the present invention state that lump material will produce a large amount of fines if the drying temperature is too high (the lump has no resistance to thermal shock). Thus drying at less than 200 °C is very important. The third step of charging and operating the direct reduction furnace at a temperature of at least 750 °C within 30 minutes is also not taught by Ando et al.

In summary, Myer et al in view of Fujita et al and Ando et al do not even teach a single step of the 3 step process of claim 27, either alone or in any combination with each other. Claim 27 and its dependent claims 28 – 32 are clearly allowable.

Claims 33 -35 are rejected under 35 USC 103 as unpatentable over Myer et al in view of Fujita et al, Ando et al and the USS publication. The examiner admits that the first 3 references do not teach storing the feed material for at least one month, and so the

examiner relies on the USS publication for that teaching. The USS publication discloses storing a 6 month supply of ore so that enough feed material is present thru the winter months, when the supply of ore from the very northern part of the US is speculative. The present invention teaches the incorporation of the stockpile, and storage for at least 1 month, to the furnace setup associating it with the feed storage bin in order to release internal stresses and increase the efficiency of the pre-drying process. Support for this distinction can be found in paragraph [0020] on page 3 of the specification. However, the USS publication does not teach the deficiencies of Myer et al, Fujita et al, and Ando et al. Further, the limitations of claim 34 and 35 are not taught by any of these references. It is important that the lump ore is heated in the direct reduction furnace at the temperature stated to reduce the fines. An insulative path and a narrow temperature range are important. When reduction is carried out at a higher average temperature fewer fines are generated with the present invention.

Claims 36 and 39 are mentioned in the paragraph bridging pages 6 and 7 of the Office Action. However these claims were not rejected here. Accordingly no comments are seen to be necessary. In fact it is noted that there are no art rejections against claims 36 – 40.

Claims 27-32 of the present invention were rejected on the grounds of obviousness-type double patenting. Claims 27-32 are patentably distinct from Claims 1-5 of the ‘690 patent. Claim 27 calls for drying the lump feed material to less than 0.5% water by weight. The Examiner writes that “it would be expected that the process of US ‘690 would result in the same content of water, since the process conditions... are substantially the same.” However the process of US ‘690 does not teach the amount of time required for the drying process, therefore ‘690 does not teach how dry to make the lump feed material. By adding a measure of dryness (0.5% water by weight) the present invention teaches how dry to make the actual feed. The present invention is an improvement over the US ‘690 process because the present invention recognizes that when using microporous lump ore, drying the ore must be done at less than 200 °C to reduce the amount of fines. US ‘690 does not mention microporous lump ore nor the

necessity to dry it using a very low temperature. The examiner relies of Fujita et al to teach microporous ore. However, the ore taught by Fujita et al is man made pellets, not naturally occurring lump ore that has microporous therein. The present invention is concerned about the generation of fines when microporous lump ore is used. The drying step is necessary to prevent fines. Because Claim 27 is patentably distinct, and claims 28-32 depend from it, they are all allowable.

Claim 33 is rejected under the judicially created obviousness type double patenting doctrine, as being unpatentable over claims 1-5 of US Patent '690 in view of the USS publication. The present invention is concerned about the generation of fines when microporous lump ore is used. The drying step is necessary to prevent fines (fine like dust that agglomerates – see page 5 of the present invention). Neither '690 nor the USS publication teach a lump ore having a microporous structure, and neither teaches a drying step as claimed in the present invention, which is necessary to prevent the generation of fines. The present invention teaches the incorporation of the stockpile, and storage for at least 1 month, in order to release internal stresses and increase the efficiency of the pre-drying process. These internal stresses and the need to increase drying efficiency only occur with lump ore that has the microporous structure. Neither '690 nor the USS publication recognize the problem and therefore fail to teach this claimed feature.

Claims 34 – 36 and 38 – 40 are rejected under the judicially created obviousness type double patenting doctrine, as being unpatentable over claims 1-5 of US Patent '690 in view of Fujita et al and the USS publication. The examiner relies of Fujita et al to teach microporous ore. However, the ore taught by Fujita et al is man made pellets, not naturally occurring lump ore that has microporous therein. The present invention is concerned about the generation of fines when microporous lump ore is used. The drying step at less than 200 °C is necessary to prevent fines. The present invention also teaches the incorporation of a stockpile and storage for at least 1 month, in order to release internal stresses and increase the efficiency of the pre-drying process. These internal stresses and the need to increase drying efficiency only occur with lump ore that has the

microporous structure. Neither '690, Fujita et al, nor the USS publication, taken alone or in combination with one another, recognize these problems and therefore fail to teach these claimed features.

Conclusion

In the paragraph bridging pages 11 and 12 of the Office Action, under "Response to Arguments" the examiner mentions JP 01152225. However it is noted that this reference is not used in any rejection. Further it is noted that there are no art rejections against claims 36 – 40, just an obviousness type double patenting rejection. Thus it is believed the examiner is indicating that upon filing a terminal disclaimer, claims 36 – 40 will be allowed. While applicant believes a terminal disclaimer is not necessary for the reason mentioned above, upon the indication of allowance of these claims by the examiner, conditioned upon a terminal disclaimer being filed, applicant is willing to file such. It is also believed that all the claims now present in the application are now in condition for allowance.

The examiner is thanked for a through examination. If there is anything the undersigned can do to influence the allowance of this application, the examiner is urged to quickly contact the undersigned.

Respectfully,

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